



# Spectral Gamma-Ray Borehole Log Data Report

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Borehole

# 30-11-09

Log Event A

## Borehole Information

Farm : <u>C</u>	Tank : <u>C-111</u>	Site Number : <u>299-E27-62</u>
N-Coord : <u>43,002</u>	W-Coord : <u>48,514</u>	TOC Elevation : <u>646.37</u>
Water Level, ft :	Date Drilled : <u>3/31/1970</u>	

## Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>100</u>	

## Borehole Notes:

This borehole was drilled in March 1970 and completed to a depth of 100 ft with 6-in.-diameter casing. The driller's log contains no mention of perforations or grouting; therefore, it is assumed that the casing is not perforated or grouted. The casing thickness is assumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. casing.

The top of the casing is the zero reference for the log. The casing lip is approximately even with the ground surface.

## Equipment Information

Logging System : <u>1B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>02/1997</u>	Calibration Reference : <u>GJO-HAN-13</u>	Logging Procedure : <u>P-GJPO-1783</u>

## Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>03/07/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>99.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>36.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

  

Log Run Number : <u>2</u>	Log Run Date : <u>03/10/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>37.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



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## Analysis Information

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Analyst : H.D. Mac Lean

Data Processing Reference : MAC-VZCP 1.7.9

Analysis Date : 09/05/1997

### Analysis Notes :

The SGLS log of this borehole was completed in two logging runs. A centralizer was used during both runs. The pre- and post-survey field verification spectra for both logging runs met the acceptance criteria established for peak shape and system efficiency. The energy and peak-shape calibration that best matched the logging run data were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging runs. Some gain drift occurred during the logging runs, making it necessary to adjust the established channel-to-energy parameters slightly for a few logging spectra to maintain proper peak identification.

Casing correction factors for a 0.280-in.-thick casing were applied during the analysis.

Cs-137 was the only man-made radionuclide detected in this borehole log. Cs-137 contamination was detected at the ground surface and almost continuously between depths of 1 and 15 ft. The measured concentrations of the Cs-137 occurrences ranged from about 0.2 pCi/g (just above the MDL) to about 0.5 pCi/g. The maximum Cs-137 concentration of about 8 pCi/g was measured at the ground surface.

The logs of the naturally occurring radionuclides show that the K-40 concentrations increase from a background of about 14 pCi/g above 39 ft to about 15 pCi/g between depths of 39 and 51 ft. Below the 51-ft depth, the K-40 concentrations continue to increase and reach a background of about 17 pCi/g below 55 ft. The Th-232 and U-238 concentrations also increase perceptibly below the 55- to 60-ft depth.

An analysis of the shape factors could not be carried out because shape factors could only be calculated in the near-surface region of the borehole where they are unreliable.

Details concerning the interpretation of data for this borehole are presented in the Tank Summary Data Report for tank C-111.

### Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.